Experiment # 4

Studies on Subsonic jet propagation.

Learning Objective:

To study the development of velocity profiles in an axisymmetric jet by using a single Pitot tube with traverse mechanism.

Proposed Plan:

a) Draw the schematic sketch of the jet flow system.

b) Measure the centerline velocity in the jet at several x/d locations.

c) Measure the velocity profiles of a jet at x/d = 10 and 20 with M = _____ (will be mentioned during lab)

d) From the acquired data, compute jet width at the two locations.

e) Compare the theoretical incompressible jet results with experimental results.

Questions:

1) What is invariant across a jet?

2) Give two practical applications for jet mixing.

3) What is jet width? How is it calculated from the velocity profile?

References:

1. Fluid dynamics of jets - Shih -I Pai

2. Turbulance - Hinze

3. A first course in turbulence - Tennekes& Lumley